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## Case Report

# Gossypiboma penetrating into the small intestine similar to Meckel's diverticulum: a report and literature review <sup>☆</sup>

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## ABSTRACT

Foreign body granuloma due to retained surgical sponge (gossypiboma) with penetration into the small intestine is very rare. Cases of gossypiboma in the abdominal cavity have sometimes been reported, yet the correct incidence has not been determined, only estimated to occur in one of every 1,000 to 1,500 intra-abdominal operations. Acute abdomen may be observed in some cases, requiring treatment. We herein introduce the case of a 70-year-old woman with gossypiboma penetrating into the small intestine presented with anemia and hematochezia. She had a history of emergency laparotomy for ectopic pregnancy several decades ago. A dynamic contrast-enhanced computed tomography revealed a hypovascular mass containing air bubbles that continued to the small intestine approximately 50 mm in size in the right lower abdomen. In addition to describing the presentation and outcome of our patient, we review the image findings of gossypiboma.

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## Introduction

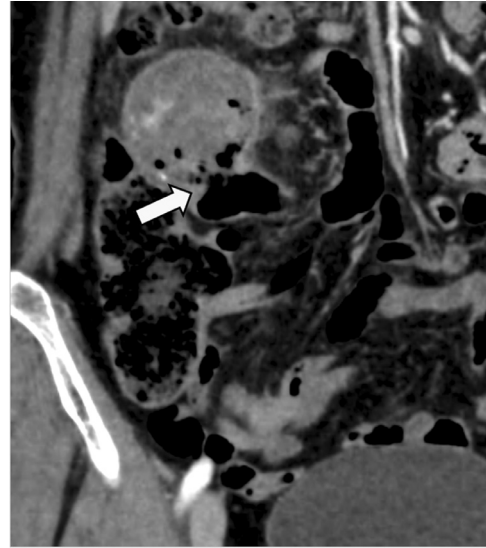
Postoperative intraperitoneal foreign body is one of the artificial complications that may arise following surgery [1–3]. Foreign body granuloma due to retained surgical sponge (termed “gossypiboma”) occurs in conjunction with an inflammatory response to a cloth material such as gauze left after surgery. Some cases are asymptomatic and discovered coincidentally, whereas others experience acute abdomen such as sepsis, intestinal obstruction, perforation, and bleeding [1–3]. Case reports of intraperitoneal foreign bodies, such as retained surgical sponges, are limited in the literature, and gossypiboma rarely penetrates the intestinal tract and causes gastrointestinal bleeding [4–6]. Here, we report a case of gossypiboma penetrating into the small intestine similar to Meckel’s diverticulum.

## Case report

A 70-year-old woman presented to the emergency department due to anemia, hematochezia, and temporary loss of consciousness. She had a history of undergoing emergency surgery for ectopic pregnancy decades ago; however, details regarding the same remained unknown.

At the time of the current admission, the patient’s clinical symptoms were stable and hemorrhagic shock was not present (heart rate: 68 bpm; blood pressure: 117/64 mmHg). Laboratory test results indicated a low hemoglobin level (7.0 g/dL); other biological parameter values were almost within reference limits.

Nonenhanced computed tomography (CT) revealed a heterogeneous low-density mass containing air bubbles, scattered calcifications in the lower right abdomen, and a tumor measuring about 50 mm at the maximum diameter (Fig. 1).

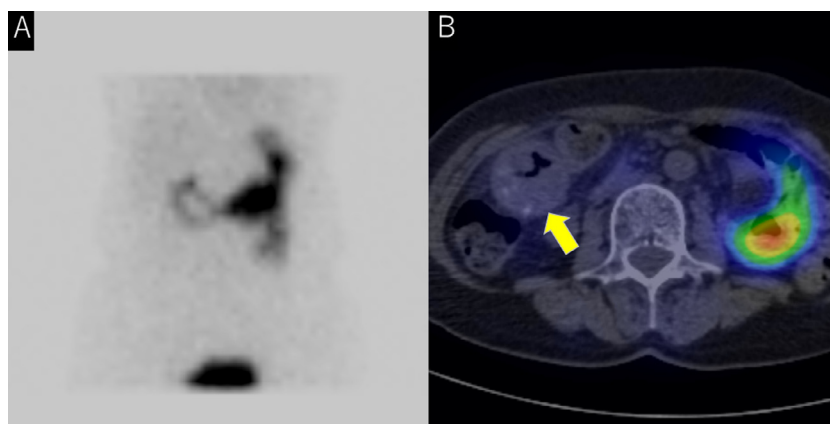


**Fig. 2 – Coronal image, contrast-enhanced CT scan (arterial phase). In coronal sections, the mass was connected and continuous with the small intestinal lumen (Fig. 2, arrow). The mass was located on the opposite side of the mesentery.**

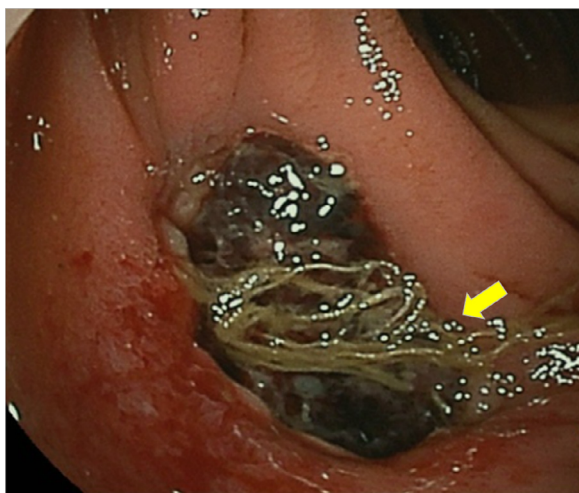
A dynamic contrast-enhanced CT scan revealed a hypovascular mass containing air bubbles and a slight degree of contrast enhancement was recognized only on the margins of the tumor in the equilibrium phase. There was no extravasation of the contrast agent to suggest active bleeding. A slight increase in fat concentration around the mass was observed. With coronal sectioning (Fig. 2) of the CT image, the mass appeared connected in a continuous fashion with the small intestinal lumen. The mass was located on the opposite side of the mesentery. Meckel’s diverticulum scintigraphy (ectopic



**Fig. 1 – Dynamic contrast-enhanced CT scans. (A) Noncontrast-enhanced CT scan. (B) Contrast-enhanced CT scan (arterial phase). (C) Contrast-enhanced CT scan (excretion phase). A nonenhanced CT scan (Fig. 1A) shows a heterogeneous low-density mass containing air bubbles and scattered calcifications in the lower right abdomen as well as a tumor measuring about 50 mm at the maximum diameter. A dynamic contrast-enhanced CT scan (Fig. 1B and 1C) reveals a hypo-vascular mass containing air bubbles, and slight contrast enhancement was recognized only in the margins in the equilibrium phase (Fig. 1C). There was no extravasation of the contrast agent that suggested active bleeding.**



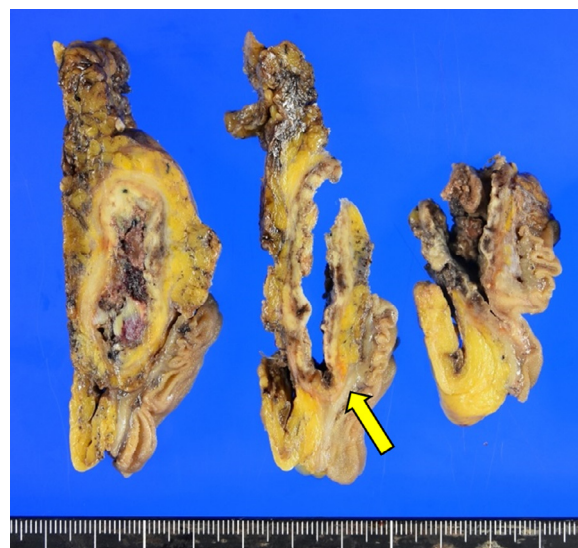
**Fig. 3 – Meckel's diverticulum scintigraphy (ectopic gastric mucosal scintigraphy using  $^{99m}\text{TcO}_4^-$ ). (A) Planar scintigraphy (50 minutes after injection). (B) SPECT-CT fusion image. This scintigraphy showed no suspicious accumulation in the mass.**



**Fig. 4 – DBE. DBE revealed a diverticulum filled with a blood clot in the distal jejunum. When the clot was removed, a necrotic substance and an artificial fibrous material (i.e., threads) were found inside (Fig. 3), which were discharged into the intestinal lumen (Fig. 3, arrow).**

gastric mucosal scintigraphy using  $^{99m}\text{TcO}_4^-$ ) showed no suspicious accumulation of ectopic gastric mucosa in the mass (Fig. 3). Based on the above findings, the presence of a small intestinal diverticulum with hemorrhage was most strongly suspected, while a self-destructed small intestine tumor was also identified.

Double-balloon endoscopy (DBE) was performed and revealed the existence of a diverticulum filled with a blood clot in the distal jejunum. When the clot was removed, a necrotic substance and an artificial fibrous material (i.e., threads) were found inside and discharged into the intestinal lumen (Fig. 4). A biopsy was collected from the periphery of the same part. Histopathological diagnosis of the biopsy specimen revealed inflammatory granulation tissue accompanied by a foreign body reaction. Partial small intestine resection was completed to control bleeding.

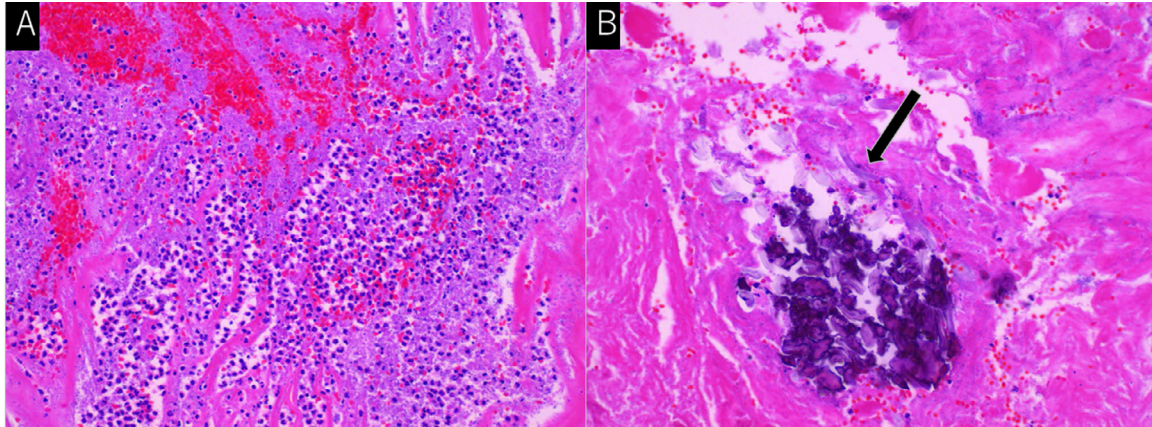


**Fig. 5 – Macroscopic appearance of the resected specimen. The macroscopic appearance of the resected specimen showed that the mass opposite the mesentery included a portion wherein granulation tissue and the small intestinal wall were apparently continuous and looked like a diverticulum (arrow).**

Operation findings revealed a mass covered by the omentum was found 170 cm distal from the ligament of Treitz and opposite to the mesentery. A small intestinal resection with 5-cm margins on the oral side and anal side centering on the mass was performed (Fig. 5).

The macroscopic appearance of the resected specimen showed that the mass opposite to the mesentery had a portion wherein the granulation tissue and the small intestinal wall were apparently continuous and looked like a diverticulum.

The pathological examination revealed that the mass was located on the jejunum and the opposite side of the mesentery. The contents were artificial foreign bodies, appearing to



**Fig. 6 – Pathological examination. (A) Abscess, hematoxylin and eosin stain  $\times 10$ . (B) Foreign bodies, hematoxylin and eosin stain  $\times 20$ . The contents were artificial foreign bodies—specifically, cotton fibers—and a large amount of granulation tissue and fibrous tissue that formed reactively to the cotton fibers, accompanied by pus (Fig. 5A). The cotton fibers were largely denatured and the boundary with the surrounding granulation tissue was unclear (Fig. 5B).**

be cotton fibers, and a large amount of granulation tissue and fibrous tissue that had formed reactively to the cotton fibers, accompanied by pus (Fig. 6A, abscess, hematoxylin and eosin stain  $\times 10$ ). The cotton fibers were largely denatured, and the boundary with the surrounding granulation tissue was unclear (Fig. 6B, hematoxylin and eosin stain  $\times 20$ ). No evidence of malignant neoplasm was found in the mass. It was speculated that a fistula had formed as a route for excretion of the pus due to an increase in the tumor internal pressure with pus retention; further, repeated mechanical stimuli due to adhesions were also thought to be involved in the fistula formation.

## Discussion

Postoperative intraperitoneal foreign body is an artificial complication of surgery, and it is expected that the number of reported cases is less than the real count due to the social background of this iatrogenic disease. Since the late 1980s, countermeasures against the perpetuation of foreign bodies in the abdominal cavity have included the use of surgical sponges with radiopaque markers as well as thoroughly counting the number of surgical sponges and confirming the correct number is present outside the body before closing the abdominal wound. Despite these countermeasures, gossypiboma is a complication that is sometimes still encountered.

According to previous reports [1–7], the intraperitoneal duration of retained surgical sponge varies. Some cases were not diagnosed until several decades after the initial surgery [7]. In the present case, the patient had a history of emergency surgery for ectopic pregnancy several decades prior, but no episodes of acute abdomen that required treatment had arisen in the time since until the current report of gastrointestinal bleeding. Imaging characteristics of gossypiboma showed that gas was trapped by the cotton fibers. However, the image findings of retained surgical sponge differ depending on the intraperitoneal indwelling period. Using

plain abdominal radiography, a gas-containing mass may be observed. Ultrasound imaging might reveal a heterogeneous mass with low to high echo. CT displays low-density to high-density tumors with a whirl-like spongiform pattern [7] and scattered calcification. Immediately after surgical sponge placement in the abdominal cavity, gas trapped by cotton fibers is apparent. In daily clinical practice, such resembles a CT observation of gauze packing conducted for damage control for uncontrollable hemorrhage in severe trauma.

In reports of cases in which the intraperitoneally retained surgical sponge has been indwelling for a long period of time, the gas often has decreased or disappeared, and many cases have been accompanied by scattered calcification [4–9].

In this case, CT showed a heterogeneous high-density mass with apparent air bubbles inside that was communicating with the small intestinal lumen, and gas could not be distinguished from gastrointestinal contamination. Meckel's diverticulum was also identified because it was located on the opposite side of the mesentery, but the distal jejunum is not a typical site of Meckel's diverticulum.

The retained surgical sponge was denatured due to the long intraperitoneal indwelling period. Moreover, the penetration of the small intestine and discharge of gossypiboma contents resulted in modified imaging findings, making it difficult to point out the presence of the surgical sponge. Small intestinal endoscopy revealed artificial fibers (threads) inside the diverticulum-like structure, which helped to facilitate the diagnosis of retained surgical sponge and foreign body granuloma penetrating into the small intestine.

There is still no established knowledge of the mechanism by which intraperitoneal foreign body granuloma penetrates the intestinal tract [7–9]. Robinson et al. [10] stated that the intestinal tract adheres around a foreign body, inflammation causes necrosis of the intestinal wall, and foreign bodies (gauze) enter the intestinal tract by intestinal peristalsis. Wattanasirichaigoon et al. [11] also reported that peristalsis is significantly involved in the penetration of the small intestine. This case involved adhesion between the mass and the

jejunum, and mechanical stimulation by peristalsis may have contributed to the penetration of the small intestine. Pathologically, the infection of foreign body granuloma and the accumulation of pus were evident. As a result of the progression of infection to the foreign body granuloma, it was presumed that, as a result of an increase in intratumoral pressure, a fistula formed together with the adhering jejunum acting as a drainage route for pus.

## Conclusion

We present a case of gossypiboma penetrating the jejunum, prompting the appearance of gastrointestinal hemorrhage in a manner similar to small intestinal diverticular bleeding. The correct diagnosis was difficult to make due to the modification of image findings associated with the penetration of the small intestine, but confirmation of the patient's medical history, especially her history of emergency surgery, and of the presence of artificial fibers (threads) using DBE helped establish the diagnosis.

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